Notebook, N-05-02-18

05-02-1[illegible]

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2/18/05.

Test of Iron Wire Resistance Lamp.

Lamp made by Dolby 2/17/05.
It contains about 56 inches of wire made by twisting 2 strands of .004" wire together. When tested on vacuum pump at .400 amps current, it showed 56.7 ohms res.

Current at each point for 15 min.

Time	Amps.	Volts	Ohms.	
A.M. 11.30	.050	.535	10.7	
	.100	1.715	17.15	
	.150	2.265	15.1	
	.200	4.28	21.4	
	.250	6.90	27.6	
	.300	10.38	34.6	
	.350	14.67	41.75	
	.400	21.2	53	
	.450	25.4	56.4	
P.M. 2.00	.500	34.	68	Glowing bright red

When .500 amps had been on lamp for about 5 minutes, volts at terminals dropped down to 31.7 from 34. I then put current down to .400 again and found the voltage now would not go above 14 and later fell to 12.

3/18/05. – When a lamp is heated up by a flame the H_2O on the glass is vaporized and conducts the heat away from the wire, consequently lowering the resistance of the wire temporarily.

Evidently some change has come about from the heating up at the high rate. Is it caused by occluded gas?

Have noticed the same thing when a lamp on the pump was heated up with a flame, i.e. the drop would always go down, but in that case it gradually came up again as the tube cooled off.

3/19/05. – Took CR drop @ 400 amps. again this morning and found it to be 11 volts or 1 volt lower than last time yesterday. Then took readings at different rates again as follows

Amps.	Volts.	Ohms.
.050	.515	10.3
.100	1.035	10.35
.150	1.60	10.67
.200	2.355	11.77
.250	3.15	12.6
.300	4.3	14.33
.350	6.60	18.86

C	E	R	
.400	11	27.5	
.450	19	42.25	
.500	28.9	57.8	
.550	38.7	70.4	Bright red.
.600	49	81.7	
.400	9.44	23.6	1.00 P.M.
"	7.9	19.75	1.40 "

19.75 ω = 34.8 o/o of original resistance.

The heating up of the wire to high temperatures seems to affect its resistance more than anything else. Perhaps the annealing it gets from being heated up by the high current and then cooling slowly as it would in a vaccuum, softens it and lowers the resistance in this way.

Iron Wire Sample made by Dalby 3/7/05. Iron .005" wire single. Sample part 18" long.

TIME	AMPS.	VOLTS	OHMS.	
	.400	34.5	86.2	on jumps.
A.M. 11.00	.300	16.5		
	.400	34.2		
"	.500	60.8		
11.10 P.M.	.400	31.4		
1.45	"	27		
5.40	"	23.7		
A.M. 7.00	"	20		3/8
8.20	.500	43.7		
9.00	"	37.1		
10.45 P.M.	"	32		
3.00	"	29		
"	.400	13	32.5	
4.30 A.M.	"	12.7		
7.00	"	12.6		3/9
10.00	"	12.7	31.7	

Put on jumps again and heated up to red for ½ hour.

(OVER)

3/9/05. The fall in resistance cannot come from softening of the wire because in that case it would not come up again when the lamp was re-exhausted.

It is evident that something gets in which conducts the heat away. It is most likely that when the wire is heated up, gases which have been occluded by the Ta are slowly driven off and gradually fill the vacuum. I should think however that these could be nearly all gotten rid of by the second exhausting.

A.M. 11.10	.400	34.2	85.5	3/9/05	
P.M. 1.10	"	29.7			
"	.460	44.3			
3.15	"	31.9			
5.50	.400	17.2			
A.M. 8.50	"	16.5		3/10	
"	.480	32			
10.30	"	29.7			
"	.500	35			
5.10	"	28			
"	.400	13.3			
A.M. 8.30	"	12.6		3/11	
P.M. 2.15	"	13			
"	.500	29			
A.M. 7.10	"	28.7		3/12	
P.M. 4.40	"	26.2			
A.M. 8.30	"	28		3/13	
"	.400	12.8		off	
Stood 26 hrs.					
A.M. 10.15	.400	12.8	32	3/14	

Filled lamp with hydrogen then put on pump and kept wire heated up to red while exhausting.

(OVER)

6.00 P.M.	.400	34	85	3/15/05	
8.40 A.M.	"	31.5		3/16	
"	.450	43.6			
9.20	"	42.5			
"	.500	57.7			
10.30 P.M.	"	50			
7.00 A.M.	"	39.8			
9.00	"	39		3/17	
" P.M.	.400	17.2			
1.00	"	16.4			
"	.500	39.8			
4.00	"	38.7			
"	.400	17		off	
8.30 A.M.	.400	16		3/18	
"	.500	39			
5.20 P.M.	"	34			
"	.400	14			
9.00 A.M.	"	14.8		3/20	
"	.500	39			
8.30	"	39		3/21	
"	.400	16.8			
10.00 P.M.	"	16			
12.30	"	16	40	off	

New Tantalum Incandescent Lamps.
Frosted. 110 V.. 25 C.P. 1.4 Watts
22 B.C.P.

Tested at different amperes to get the effect of temperature on the resistance.

Amps.	Volts #1	Volts #2	Ohms #1	Ohms #2	
.160	33	31.5	206.0	210	
.200	49.6	46.9	248.	234.5	
.250	68.2	64	272.7	256	
.300	87.8	82.6	292.7	275.4	
.350	107.8	101.5	308	290	
.356	110		309.		1.78 watts /pr B.C.P.
.372		110		295.8	1.86 " "

Put the two lamps in multiple to see if we could measure for resistance on the small cell Tipdynamo.

.350	40.9	116.8	
.400	49.2	123	
.450	58	128.9	
.500	67	134	

Resistance in air of .003" Pt wire. Used 30.5 inches.

.200 amps.	9 V. drop	=	45 Ω	resistance
.300 "	14 "	=	46.6	"
.400 "	19.4 "	=	48.5	"
.500 "	25.9 "	=	51.8	"

Lamp made of #34 (.0063") Climax Resistance wire. 15" support = about 61.5" of wire.

.200 amps.	16.2 V.	= 81 ω res.		
.300 "	25.4 "	= 84.5 "		
.400 "	35 "	= 87.5 "		
" "	34.5 "	= 86.2 "	after 1½ hrs.	
" "	34.5 "	= 86.2 "	" 2 days.	

New Edison Lamps.

80 V. 16 C.P.

Mil-Amps.	Volts — #1	Volts — #2	Volts — #3	Ohms. #1
100	14.6	13.4	14.2	146
200	25.2	23.8	24.7	126
300	35.8	34.2	35.2	119.3
400	46.3	45.2	45.7	115.7
500	57.1	56.9	56.8	114.2
707	80			113.9
698		80		
708			80	

Watts per C.P. #1 = 3.51